

CLAIMS

What is claimed is:

1. A system comprising:
a tunable filter driven by an output signal of a transmitter to provide a filtered output signal, the tunable filter including at least one tunable component that is adjustable to provide the filter with a desired transfer function corresponding to loop characteristics of an associated communications network, the filtered output signal being combined with a signal from the associated communications network to provide a receiver signal that is substantially free from echo caused by the output signal of the transmitter.
2. The system of claim 1, the associated communications network comprising a digital subscriber link.
3. The system of claim 1, the tunable filter further comprising a hybrid circuit comprising at least one amplifier stage and at least one tunable component located in at least one of a feedback path and a feedforward path of the amplifier stage.
4. The system of claim 1, further comprising a line coupling network that provides an interface between the transmitter and the associated communications network.
5. The system of claim 4, the signal from the associated communications network comprising an aggregate line signal that includes a component corresponding to the echo caused by the transmitter output signal and a receiver signal component, the system further comprising a summer that combines the filtered output signal from the tunable filter and the aggregate line signal to provide

the receiver signal that is substantially free from echo caused by the output signal of the transmitter.

6. The system of claim 5, further comprising a control system operative to selectively configure the tunable filter to mitigate the echo caused by the output signal of the transmitter.

7. The system of claim 6, the control system further comprising a tuning algorithm that selectively adjusts at least one variable passive component in the tunable filter to provide the tunable filter with a desired frequency response corresponding to loop characteristics of the associated communications network.

8. The system of claim 7, the at least one variable passive component comprising at least one capacitor.

9. The system of claim 7, further comprising a switch network coupled to adjust the at least one variable passive component so that the tunable filter achieves the desired frequency response.

10. The system of claim 9, further comprising a decoder that receives a control signal from the control system and provides an output signal to activate the switch network to set a desired impedance for the at least one variable passive component.

11. The system of claim 7, the tunable filter comprising a biquad filter, the at least one variable passive component located in at least one of a feedback path and a feedforward path of the biquad filter.

12. A system, comprising:

means for separating transmit and receive signals at an interface between a central office and a subscriber loop; and

means for tuning the separating means to provide the separating means with a desired frequency response corresponding to loop impedance and line coupling characteristics of an associated communications network to mitigate echo effects of the transmit signal.

13. The system of claim 12, further comprising means for selectively adjusting an impedance parameter in the means for separating to provide the means for separating with the desired frequency response.

14. The system of claim 13, the impedance parameter comprising at least a capacitance parameter.

15. The system of claim 13, the desired frequency response being adaptable to a plurality of predetermined frequency bands associated with the loop impedance and line coupling characteristics.

16. A method, comprising
filtering a transmitter signal to provide a filtered transmitter signal having a frequency response;
selectively adjusting the frequency response based on loop impedance characteristics of an associated subscriber loop; and
combining the filtered transmitter signal with an aggregate line input signal from the associated communications network to provide a receiver input signal that is substantially free of echo due to the transmitter signal.

17. The method of claim 16, further comprising determining the loop impedance characteristics of the associated communications network.

18. The method of claim 17, the determination of the loop impedance characteristics further comprises applying a test signal at a transmitter output comprising the transmitter signal.

19. The method of claim 16, the selectively adjusting further comprises setting impedance characteristics in at least one of a feedforward path and a feedback path of a tunable hybrid.

20. The method of claim 19, the at least one of a feedforward path and a feedback path further comprises a capacitor network, the selectively adjusting further comprises setting a desired capacitance for the capacitor network that provides the desired frequency response.

21. The method of claim 16, further comprising:
applying a test signal to a line in the associated communications network;
measuring a response to the applied test signal; and
re-adjusting the frequency response on the measured response.

22. The method of claim 16, the selectively adjusting further comprises:
setting a tunable parameter that changes the frequency response of a hybrid circuit driven by the transmitter signal;
applying a test signal to an associated communications network; and
determining a ratio of a received signal relative to the transmitter signal.

23. The method of claim 22, storing the tunable parameter setting if a ratio of the received signal to the transmitted signal has improved.

24. The method of claim 22, the tunable parameter of the hybrid circuit comprising a plurality of settings, the method further comprising selecting the next setting until all of the settings have been tested.